

Docket No.: 14113-00012-US
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Horst Vestweber et al.

Application No.: 10/580,491

Confirmation No.: 2381

Filed: May 23, 2006

Art Unit: 1794

For: ORGANIC ELECTROLUMINESCENT
ELEMENT

Examiner: G. D. Clark

1.132 DECLARATION OF DR. ANJA GERHARD

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

1. I, Anja Gerhard, am a citizen of Germany and reside at Im Bruehl 101, Egelsbach, Germany and hereby declare and say as follows:
2. I am a fully trained chemist, having studied chemistry at the University of Marburg, Hessen, Germany. I am well acquainted with technical English.
3. Work experience:
 - 1993 – 2002: Studies in chemistry at the University of Marburg, Germany
 - 2002: PhD degree with the title “Delayed Fluorescence and Phosphorescence of Π -conjugated polymers” in the research group of Prof. Heinz Baessler.
 - 1999 – 2000: 6 months of research in the group of Prof. Richard Friend at the University of Cambridge, United Kingdom.

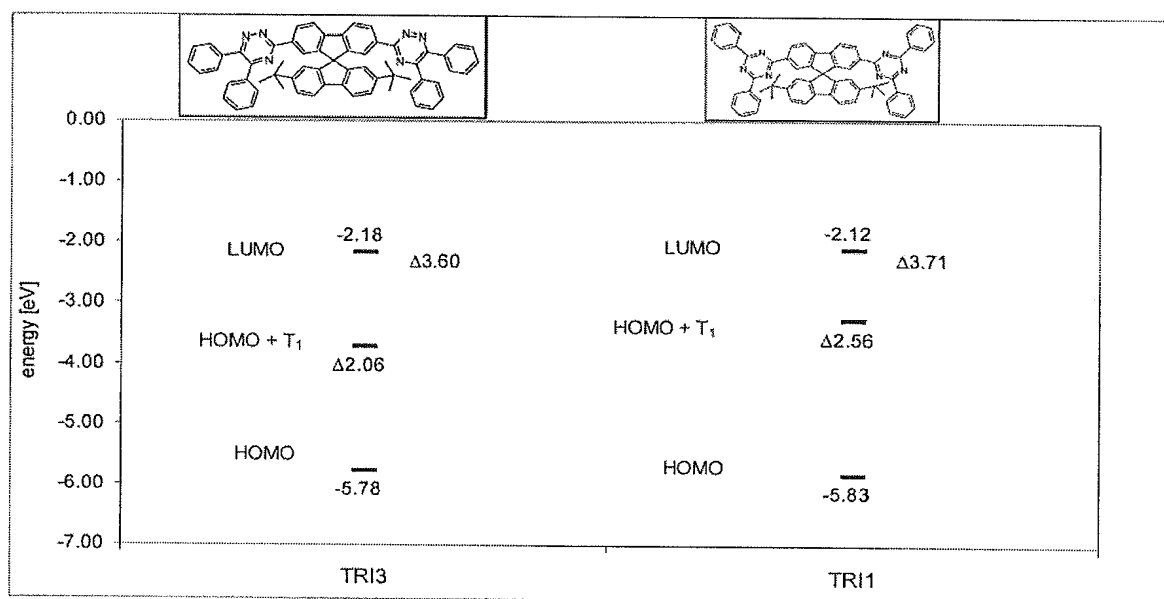
2002 – 2005: Material Scientist and Physicist at COVION Organic Semiconductors GmbH, Frankfurt, Hessen, Germany

2005 – 2006: Material Scientist and Physicist at the Merck Organic Materials GmbH, Frankfurt, Hessen, Germany

2007 – today: Material Scientist and Physicist at the Merck KGaA, Frankfurt, Hessen, Germany

4. In the field of organic light emitting diode (OLED), I am inventor up to now of at least 40 World wide patent and patent publications and author of more than 10 publications and lectures.
5. I consider myself to be an expert and to be skilled in the organic electroluminescent art and particularly in the OLED field.
6. I am one of the inventors of U.S. Serial No. 10/580,491 ('491 application) and I am familiar with the '491 application.
7. In the '491 application we had the synthesis conducted of the compounds 2,7-bis (4,6-diphenyl-1,3,5-diazin-2-yl)-2',7'-di-tert-butylspiro-9,9'-bifluorene (TRI1) and (2,7-bis (5,6-diphenyl-1,2,4-diazin-3-yl)-2',7'-di-tert-butylspiro-9,9'-bifluorene) (TRI3) (see pages 15 and 16 of the '491 application).
8. I had the triplet level calculated by a quantum chemical calculation by the following method: TD-SCF B3PW91/6-31 G(d)//AM1. The triplet level and the HOMO and LUMO levels of the compounds TRI1 and TRI3 are depicted in the following graph. The triplet energy of TRI1 is 2.56 eV whereas the triplet energy of TRI3 is 2.06 eV. As can

be easily seen, TRI1 is suitable as hole blocker for triplet green and red devices as it has a sufficiently high triplet energy. In contrast, the triplet energy of TRI3 (2.06 eV) is in the same range as the triplet energy of a deep red triplet emitter (approximately 2.0-2.1 eV). Therefore, TRI3 might be used as a hole blocking material for a deep red triplet emitter, but is expected to quench emission when used in a hole blocking layer in combination with a green or blue emitting layer. Such quenching reduces the efficiency of the device.



6. It is an unexpected result that there is such a considerable difference in triplet energy between a 1,3,5-triazine derivative and a 1,2,4-triazine derivative. This result could not have been predicted by the person skilled in the art.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are

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punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dec. 17th, 2010
Date

Dr. Anja Gerhard
Dr. Anja Gerhard